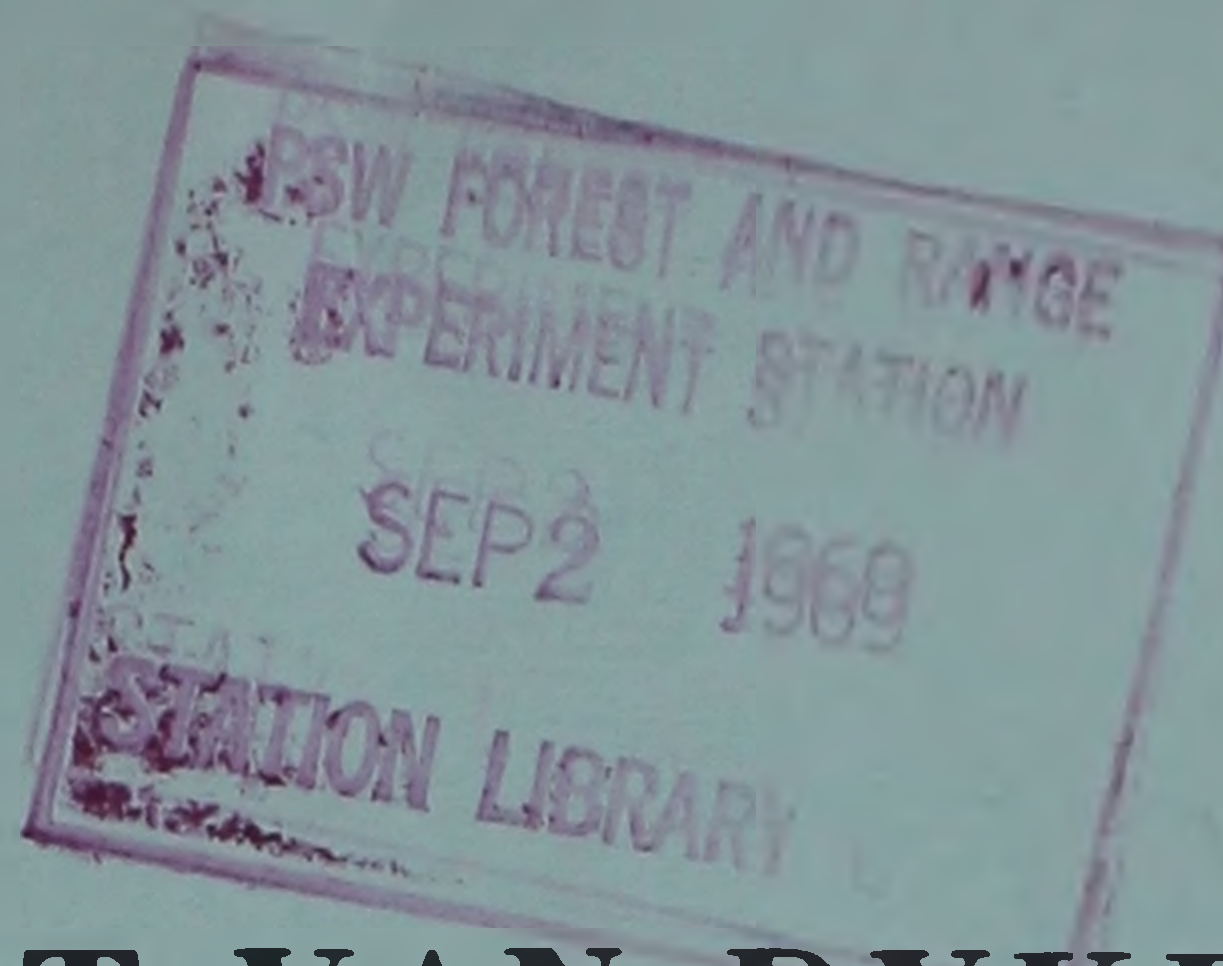


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TREES OF JOST VAN DYKE (BRITISH VIRGIN ISLANDS)

BY

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U. S. DEPARTMENT OF AGRICULTURE



RESUMEN

Jost Van Dyke, una de las Islas Vírgenes Británicas, cuenta con 69 especies de árboles anotadas como nativas y 18 otras especies como introducidas. Esta pequeña isla tiene una área de menos de 4 millas cuadradas y está situada 5 millas al norte de St. John, esta última perteneciente a las Islas Vírgenes de los Estados Unidos.

La lista está basada en una excursión y colecciones hechas por el autor durante abril 11 - 13 del 1967 y contiene datos sobre especies conocidas desde mucho antes en las islas adyacentes. La mayoría de las especies nativas tienen una distribución amplia y ninguna es endémica. Actualmente la vegetación consiste mayormente de matorrales, arbustos, pastizales y árboles pequeños esparcidos que aún quedan del bosque original caedizo. Hay áreas pequeñas de manglares, bosque litoral y bosque húmedo siempre verde.

TREES OF JOST VAN DYKE (BRITISH VIRGIN ISLANDS)

By Elbert L. Little, Jr.¹

Sixty-nine tree species are recorded here as native on Jost Van Dyke, one of the British Virgin Islands, and 18 other species noted as introduced. This list, based on my field work and collections on April 11-13, 1967, provides distribution records of species previously known from adjacent islands. It is also a contribution of the U.S.D.A. Forest Service project on forest trees of the Caribbean area under the International Biological Program.

No tree records from Jost Van Dyke were cited by Britton and Wilson (3), Eggers (5), or Little and Wadsworth (6). Collections from this island have been needed for distribution records in the forthcoming second volume of the trees of Puerto Rico and the Virgin Islands.

A list of the dicotyledons of Tortola has been published recently by D'Arcy (4). Tortola, the nearest larger island and largest of the British Virgin Islands, is less than 4 miles east and southeast of Jost Van Dyke. Much general information recorded for Tortola, for example, climate, history of cultivation, and floristic affiliations, applies also to nearby Jost Van Dyke.

DESCRIPTION OF JOST VAN DYKE

Fourth largest in size among the British Virgin Islands, Jost Van Dyke is located at 64° 43' West longitude and 18° 27' North latitude, less than 4 miles west of the nearest point of Tortola, also only 5 miles north of St. John and 9 miles northeast of St. Thomas, both in the United States Virgin Islands. Depth of water from one island to another does not exceed 15 fathoms. This small volcanic island lies about 60 miles east of the northeast corner of Puerto Rico and about 1,100 miles east-southeast of Miami, Fla. It is the unnamed island north of St. John on the map of Puerto Rico and the Virgin Islands in Little and Wadsworth (6, fig. 1 on p. x).

Jost Van Dyke is less than 4 square miles in area, about 4 miles long in greatest, east-west dimension and up to 1-1/2 miles in the north-south dimension, mostly narrower. Like many others, there is a smaller island, Little Jost Van Dyke, on the northeast and almost connected. The British Virgin Islands appear mostly to be volcanic peaks whose bases formerly were continuous but are now submerged.

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For its size, Jost Van Dyke has a relatively high altitude, 1,054 feet (1,070 feet on one map), and almost no flat land (fig. 1).



Figure 1.—Jost Van Dyke from the south, showing at base Great Bay with grove of coconuts, above on steep south-facing slopes the pastures, shrub thickets, and scattered trees of seasonal deciduous forest, and at top the highest peak (1,054 feet) and ridge.

F-518629

The steep rocky slopes of volcanic aggregate rise to a central east-west ridge with two peaks more than 1,000 feet above sea level. The tropical climate is relatively dry. Winds are strong and constant from the northeast. There is no permanent surface water, though springs near the base provide water for domestic use. On the south side are three bays or harbors with small settlements connected by a road. As yet this quiet island has not been affected by tourism.

Great Bay, the central harbor, served as a base for field work. Collecting trips on foot were made up trails to the two highest peaks and into the steeper north slope. Additional collections were made near sea level in the vicinity of Great Bay.

VEGETATION

The vegetation of Jost Van Dyke is like that of other small dry West Indian islands. Nearly a century ago Eggers (5, p. 6-13) described briefly the vegetation of the Virgin Islands but did not mention Jost Van Dyke. Large areas had been cultivated with sugarcane and already abandoned (except on St. Croix) or had been used for pasture by cattle, sheep, and goats. Not less than one-third of the islands was covered by a dry shrubby vegetation of grayish or yellowish aspect characterized by a few species of *Croton*.

The vegetation of the British Virgin Islands was described by Beard (2, p. 174-180). Most of the upland of Jost Van Dyke probably was covered originally by a seasonal deciduous forest. However, the present vegetation consists largely of shrub thickets, open with some grassland pastures and scattered small trees (fig. 1). As the land is used mainly as pasture for goats and cattle, man has cleared the original vegetation and kept it open, partly by occasional fires. A few very small areas are cultivated.

The mangrove swamp forest is present in a small area of silt shore at Great Bay. Here *Rhizophora mangle* is the dominant mangrove, becoming more than 50 feet tall and 1 foot in trunk diameter above the stilt roots (fig. 2). The two other species of mangrove here, *Avicennia nitida* and *Laguncularia racemosa*, reach similar diameters though lesser heights. However, the fourth mangrove, *Conocarpus erectus* L., and another associated species of adjacent islands, *Bontia daphnoides* L., were not seen. Mangroves of all three species here are somewhat larger than the stunted mangroves, always of low growth, no more than 10 feet high, observed by Beard in the British Virgin Islands. Perhaps in other parts of the West Indies, mangrove trees once grew to large size before removal by cutting.



Figure 2.—Mangrove swamp forest at Great Bay with mangroves (*Rhizophora mangle*) more than 50 feet tall. 17-518630

Characteristic tree species along the sandy shore at Great Bay include: *Cocos nucifera*, *Coccoloba uvifera*, *Annona glabra*, *Thespesia populnea*, *Cassine xylocarpa*, and *Colubrina reclinata*. However, *Hippomane mancinella* L., common in other islands, was not seen.

A coastal plain forest occupies small, nearly level areas at Great Bay, perhaps supplied by underground seepage near the springs. Here *Ceiba pentandra*, the largest tree of the island, becomes 70 feet tall and 3 feet in trunk diameter. Associated tree species are *Trema micrantha*, *Spondias mombin*, and *Cordia collococca*.

The seasonal deciduous forest, a relatively dry forest of small trees, probably once occupied most of the rocky upland, especially the south-facing slopes and the windswept northeast facing slopes (fig. 3). Trees left after cutting operations seldom are more than 20 feet high and generally have soft, relatively undesirable woods. Common species are: *Pisonia subcordata*, *Acacia maracantha*, *A. muricata*, *Leucaena glauca*, *Piscidia piscipula*, *Bursera simaruba*, *Bunchosia glandulosa*, *Adelia ricinella*, and *Tabebuia heterophylla*.



Figure 3.—Shrub thicket and scattered trees of seasonal deciduous forest, looking southeast along ridge at about 700 feet altitude. The wind-shaped tree at right is *Bumelia obovata*.
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Other characteristic, mostly shrubby species of this type are: *Coccoloba microstachya*, *Capparis coccolobifolia*, *Capparis flexuosa*, *Pictetia aculeata*, *Amyris elemifera*, *Euphorbia petiolaris*, *Comocladia dodonaea*, *Schaefferia frutescens*, *Krugiodendron ferreum*, *Eugenia monticola*, *Plumeria alba*, *Bourreria succulenta*, *Tecoma stans*, *Exostema caribaeum*, and *Randia aculeata*.

Shrub thickets occupy some areas following overgrazing by goats or shifting cultivation. The common shrub, *Croton rigidus* (Muell.-Arg.) Britton, sometimes is treelike and 12 feet high. One species of tree cactus with columnar stems, *Cephalocereus royenii*, is scattered in the dry shrub thicket on steep slopes bordering the sea.

Remnants of a moist evergreen forest persist in outcrops of boulders north of the highest ridge and in ravines on the steep north-facing slope. Here are found scattered trees of the following species: *Ficus laevigata*, *Nectandra coriacea*, *Zanthoxylum monophyllum*, *Clusia rosea*, *Daphnopsis americana*, *Ardisia obovata*, *Bumelia obovata*, *Linociera caribaea*, and *Cordia sulcata*. An undergrowth shrub is *Psychotria microdon* (DC.) Urban. This vegetation type has a few species present also in the much better developed moist evergreen forest only 5 miles away on Sage Mountain (altitude 1,710 feet), Tortola, the highest point in the Virgin Islands, Beard (2, p. 177-179) designated that type as a "xerophytic rain forest" and published a species list. In 1954 I made a collection of the trees on Sage Mountain also. Fortunately part of that unusual forest has been designated as a preserve.

DISTRIBUTION NOTES

Most tree species native on Jost Van Dyke have widespread distribution in similar habitats in the Virgin Islands or beyond, some extending through the West Indies to Florida or Venezuela or elsewhere on the continent. Some of these islands are separated by relatively shallow seas and probably have been joined into larger islands at times during their geologic history. However, these oceanic islands of mostly volcanic origin have not been a part of a continent. During times of maximum glaciation in the Pleistocene epoch, as recently as about 11,000 years ago, the great

ice sheets accumulated enough water to cause the ocean levels to drop more than 200 feet. In those intervals, the Virgin Islands (except St. Croix) were united as one large island continuous through Culebra and Vieques to Puerto Rico. Thus, plant species, especially of dry lowlands, could migrate and become widely disseminated before the separation into islands by rising waters. Also, the distance of only a few miles from adjacent islands is insufficient barrier to isolate Jost Van Dyke or prevent dissemination of seeds by agents, such as wind, hurricanes, and water.

Of special interest are a few tree species of relatively small geographic range listed below. No undescribed tree species endemic to this small island was found nor expected.

Sida eggersii E. G. Baker is perhaps the most unusual as well as the rarest tree species of Jost Van Dyke. Britton and Wilson (3,5:555) called it "one of the most interesting species of our Flora." It was discovered on Tortola by Heinrich F. A. Eggers and afterwards was found on Culebra, perhaps also on St. Thomas. However, it was not seen on Tortola by D'Arcy (4, p. 425) and might be extinct there now. A single sterile tree 20 feet high and 4 inches d.b.h. was discovered in the seasonal deciduous forest at about 800 feet altitude on the divide in the eastern part of Jost Van Dyke. Though trees are rare in this genus, Britton and Wilson recorded the size of this species up to 26 feet high, with a trunk 6 inches in diameter or more. The 16 other native species of this genus were described by those authors as herbs and 4 of these somewhat woody. Somehow this endemic tree species evolved from much smaller ancestors and spread to what are now 3 or 4 separate islands.

Cordia rickseckeri Millsp. was known from dry forests of eastern and southern Puerto Rico, Culebra, Vieques, St. Thomas, St. John, and Tortola.

Reynosa guama Urban was recorded by Britton and Wilson (3, 5:333) as endemic to St. Thomas, St. John, and Virgin Gorda but has since been found also at Guánica in southwestern Puerto Rico.

Eugenia cordata (Sw.) DC. was listed by Britton and Wilson (3, 6:38) as endemic to Culebra, St. Croix, St. Thomas, St. John, and Tortola.

Morisonia americana L. is recorded from St. Croix, St. Thomas, St. John, Tortola, Vieques, Culebra, and Desecheo, but not Puerto Rico, and extends through the Lesser Antilles to northern South America.

A few species of introduced trees have become widespread and naturalized on Jost Van Dyke. *Tamarindus indica* (tamarind) is a common spreading tree 30 feet or more in height and 2 feet or more in trunk diameter. *Annona squamosa* (sugar-apple), a cultivated fruit tree, is common in pastures. *Cocos nucifera* (coconut) and *Thespesia populnea* ("haiti-haiti") are established here as elsewhere on tropical sandy shores.

COMPARISON WITH TORTOLA

By the publication of lists by islands, precise information on distribution of species becomes available. The recently published checklist of the dicotyledons of Tortola by D'Arcy (4) makes possible a comparison of the tree species of these islands less than 4 miles apart but formerly united with others including Puerto Rico perhaps as late as 11,000 years ago. Tortola, a larger and higher island, has about twice as many native tree species as the 69 listed here for Jost Van Dyke.

More significant are the 8 tree species collected by me on Jost Van Dyke but not reported from Tortola by D'Arcy during 2 or 3 years of botanical work nor earlier by Britton or Eggers. These 8 tree species reaching their limits on Jost Van Dyke and other nearby islands but absent from Tortola are:

Capparis coccolobifolia, *Zanthoxylum monophyllum*, *Savia sessiliflora*, *Maytenus elliptica*, *Reynosia guama*, *Daphnopsis americana*, *Eugenia ligustrina*, *Linociera caribaea*.

All 8 have been recorded from St. Thomas and Puerto Rico, all except *Linociera caribaea* from St. John and all except *Reynosia guama* from St. Croix. These 4 are present also on the continent in South America, the first 2 also in Central America: *Zanthoxylum monophyllum*, *Daphnopsis americana* (*D. caribaea*), *Eugenia ligustrina*, and *Linociera caribaea*. Two more extend to Hispaniola and other West Indian islands: *Savia sessiliflora* and *Maytenus elliptica*.

Capparis coccolobifolia is known from only 7 islands: Puerto Rico, Vieques, Culebra, St. Croix, St. Thomas, St. John, and Jost Van Dyke. *Reynosia guama*, mentioned above, has been found on only 5 islands: Puerto Rico (Guánica in southwestern P. R.), St. Thomas, St. John, Jost Van Dyke, and Virgin Gorda (about 8 miles east of Tortola).

STATISTICAL SUMMARY

As listed here, Jost Van Dyke has 69 species of native trees in 54 genera and 33 plant families. Eighteen introduced species, mostly fruit trees, raise the total to 87 species of trees in 69 genera and 37 plant families. Thorough botanical exploration of the island, particularly of groves of evergreen trees on the steep north-facing slope, might yield a few additions. Also, possibly a few rare species present on islands nearby might have become extinct here following disturbances by man.

The number of tree species counted in an area is subject to the definition used for a tree. Trees may be defined as woody plants having one erect perennial stem or trunk at least 3 inches (7.5 centimeters) in diameter at breast height (d.b.h. or at 4-1/2 feet or 1.4 meters), a more or less definitely formed crown of foliage, and a height of at least 12 to 15 feet (4 meters). Several species listed here were not observed so large on Jost Van Dyke, though they probably attained larger dimensions in the original vegetation and reach tree size elsewhere in the Virgin Islands. Thus, their occurrence on Jost Van Dyke should be cited in tree ranges.

Jost Van Dyke obviously has fewer tree species than the larger and higher islands nearby, which obtain more rainfall from the trade winds. St. John (altitude 1,193 feet) has larger areas of moist evergreen forest. The richer forest on Sage Mountain (altitude 1,710 feet) on Tortola has been mentioned.

Several species of common tropical fruit trees are cultivated here. These introductions, indicated by an asterisk (*) in the list, may be noted for possible future reference: *Annona muricata* (soursop), *Annona squamosa* ("apple" or sugar-apple), *Persea americana* ("pear" or avocado), *Tamarindus indica* (tamarind), *Anacardium occidentale* (cashew), *Mangifera indica* (mango), *Spondias purpurea* (purple mombin), *Melicoccus bijugatus* (kinap or Spanish-lime), *Carica papaya* (papaya), and *Psidium guajava* (common guava). Cultivated ornamentals include *Delonix regia* (flamboyant-tree), *Nerium oleander* (oleander), and *Crescentia cujete* (calabash-tree).

LIST OF TREES OF JOST VAN DYKE

In the list below, the nomenclature follows Little and Wadsworth (6) except for a few additional species. The 18 introduced species are indicated by an asterisk (*). Local common names for some species have been added in quotation marks. Maximum heights and trunk diameters are given for species observed to attain 20 feet.

Herbarium specimens were collected of nearly all tree species, except the familiar cultivated trees. Identifications are by me. The assistance of Roy O. Woodbury in naming several sterile specimens is gratefully acknowledged. Duplicate sets of the herbarium specimens collected on Jost Van Dyke have been deposited in the following herbaria: U.S. National Museum of Natural History, Washington, D.C.; Institute of Tropical Forestry, U.S. Forest Service, Rio Piedras, Puerto Rico; Arnold Arboretum of Harvard University; and British Museum (Natural History).

Palmae

**Cocos nucifera* L., "coconut." Tree 25 feet high.

Ulmaceae

Trema micrantha (L.) Blume

Moraceae

Ficus laevigata Vahl. Tree 20 feet high and 4 inches d.b.h.

Polygonaceae

Coccoloba microstachya Willd.

Coccoloba uvifera (L.) L., "grape tree." Tree 20 feet high and 6 inches d.b.h.

Coccoloba venosa L., "chicory-grape."

Nyctaginaceae

Pisonia subcordata Sw. Tree 30 feet high and 1 foot d.b.h.

Annonaceae

Annona glabra L., "pond-apple." Tree 20 feet high and 6 inches d.b.h.

**Annona muricata* L., "soursop."

**Annona squamosa* L., "apple" (sugar-apple). Tree 20 feet high and 4 inches d.b.h.

Lauraceae

Nectandra coriacea (Sw.) Griesb.

**Persea americana* Mill., "pear" (avocado).

Capparidaceae

Capparis baducca L.
Capparis coccolobifolia Mart.
Capparis flexuosa (L.) L.
Capparis indica (L.) Fawc. & Rendle
Morisonia americana L.

Leguminosae—Mimosoideae

Acacia farnesiana (L.) Willd., “casha-tree.”
Acacia macracantha Humb. & Bonpl. Tree 30 feet high and 1 foot d.b.h.
Acacia muricata (L.) Willd. Tree 25 feet high and 4 inches d.b.h.
Leucaena glauca (L.) Benth.
Pithecellobium unguis-cati (L.) Benth.

Leguminosae—Caesalpinioideae

**Delonix regia* (Bojer) Raf.
**Parkinsonia aculeata* L. “Jerusalem-thorn.” Tree 20 feet high and 3 inches d.b.h.
**Tamarindus indica* L., “tamarind.” Tree 30 feet high and 2 feet d.b.h.

Leguminosae—Lotoideae (Fabaceae)

Pictetia aculeata Vahl Urban
Piscidia piscipula (L.) Sarg.

Erythroxylaceae

Erythroxylon rotundifolium Lunan

Rutaceae

Amyris elemifera L.
Zanthoxylum monophyllum (Lam.) P. Wilson

Burseraceae

Bursera simaruba (L.) Sarg. Tree 30 feet high and 1-1/2 feet d.b.h.

Malpighiaceae

Bunchosia glandulosa (Cav.) DC.

Euphorbiaceae

Adelia ricinella L. Tree 20 feet high and 4 inches d.b.h.

Euphorbia petiolaris Sims

Gymnanthes lucida Sw.

Savia sessiliflora (Sw.) Willd.

Anacardiaceae

**Anacardium occidentale* L.

Comocladia dodonaea (L.) Urban

**Mangifera indica* L., "mango"

Spondias mombin L., "plum." Tree 50 feet high and 2 feet d.b.h.

**Spondias purpurea* L.

Celastraceae

Cassine xylocarpa Vent. (*Elaeodendron xylocarpum* (Vent.) DC.)

Maytenus elliptica (Lam.) Krug & Urban

Schaefferia frutescens Jacq.

Sapindaceae

**Melicoccus bijugatus* Jacq., "kinap." Tree 30 feet high and 1 foot d.b.h.

Rhamnaceae

Colubrina arborescens (Mill.) Sarg.

Colubrina reclinata (L'Her.) Brongn.

Krugiodendron ferreum (Vahl) Urban

Reynosa guama Urban

Malvaceae

**Gossypium hirsutum* L., "wild cotton."

Sida eggersii E. G. Baker. Rare. Only 1 tree seen, 20 feet high and 4 inches d.b.h.

**Thespesia populnea* (L.) Soland., "haiti-haiti." Tree 20 feet high and 4 inches d.b.h.

Bombacaceae

Ceiba pentandra (L.) Gaertn., "silk-cotton-tree." Tree 70 feet high and 3 feet d.b.h.

Guttiferae

Clusia rosea Jacq. Tree 20 feet high and 5 inches d.b.h.

Caricaceae

**Carica papaya* L., "papaya."

Cactaceae

Cephalocereus royenii (L.) Britton & Rose. Columnar cactus 20 feet high.

Thymelaeaceae

Daphnopsis americana (Mill.) J. R. Johnston (*D. caribaea* Griseb.)

Rhizophoraceae

Rhizophora mangle L. Tree 50 feet high and 1 foot in trunk diameter.

Combretaceae

Bucida buceras L.

Laguncularia racemosa (L.) Gaertn. f. Tree 30 feet high and 8 inches d.b.h.

Myrtaceae

Eugenia biflora (L.) DC. (*E. lancea* Poir.)

Eugenia cordata (Sw.) DC.

Eugenia floribunda West

Eugenia ligustrina (Sw.) Willd.

Eugenia monticola (Sw.) DC.

**Psidium guajava* L.

Theophrastaceae

Jacquinia berterii Spreng.

Myrsinaceae

Ardisia obovata Desv.

Sapotaceae

Bumelia obovata (Lam.) A. DC. Tree 20 feet high and 8 inches d.b.h.

Oleaceae

Linociera caribaea (Jacq.) Knobl. Tree 20 feet high and 4 inches d.b.h.

Apocynaceae

**Nerium oleander* L.

Plumeria alba L. Tree 20 feet high and 4 inches d.b.h.

Asclepiadaceae

**Calotropis procera* (Ait.) R. Br.

Boraginaceae

Bourreria succulenta Jacq.

Cordia alliodora (Ruiz & Pav.) Oken. Tree 20 feet high.

Cordia collococca L. (*C. glabra* L.), "manjack." Tree 25 feet high and 8 inches d.b.h.

Cordia rickseckeri Millsp. (*Sebesten rickseckeri* (Millsp.) Britton), "manjack."

Tree 25 feet high and 5 inches d.b.h.

Cordia sulcata DC. Tree 20 feet high and 6 inches d.b.h.

Verbenaceae

Avicennia nitida Jacq., "salt-pond-tree." Tree 30 inches high and 1-1/2 feet d.b.h.

Citharexylum fruticosum L.

Clerodendrum aculeatum (L.) Griseb. (*Volkameria aculeata* L.), "haggarbush."

Bignoniaceae

**Crescentia cujete* L., "calabash."

Tabebuia heterophylla (DC.) Britton, "cedar." Tree 30 feet high and 5 inches d.b.h.

Tecoma stans (L.) H.B.K.

Rubiaceae

Exostema caribaeum (Jacq.) Roem. & Schult. Tree 20 feet high and 3 inches d.b.h.

Guettarda parviflora Vahl

Randia aculeata L.

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Beard (1) in 1945 described the forests of the British Virgin Islands and published a land utilization map. The list of the principal components of the seasonal deciduous forest or "dry woodlands" on Tortola, Virgin Gorda, and Jost Van Dyke included 12 species of trees and several of shrubs, with both common and scientific names. Land classes mapped on Jost Van Dyke were thorn bush and scrub, a mixture of the preceding with pasture and arable, and a small amount of coconut plantation.

Little, Elbert L., Jr.

1969. Trees of Jost Van Dyke (British Virgin Islands).
U.S. Forest Serv. Res. Paper ITF-9, 12 pp., illus.
Institute of Tropical Forestry, Rio Piedras, Puerto Rico.

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O.D.C. 174

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